A STUDY ON THE GENUS *CRANAE* STÅL (ORTHOPTERA, ACRIDOIDEA, CATANTOPINAE)

by

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With 45 text-figures and five plates

Abstract

In *Cranae* at least 20 species are recognized. Unlike in previous studies, the diagnostic emphasis is laid on morphological distinction rather than on colour characters. *Cranae rufofemorata* Willemse, and its variety *obscura*, are synonymized with *Cranae tibialis* Brunner. *Cranae patagiata coerulipes* (C. Bolívar) is considered a synonym of *Cranae patagiata* Stål. The following new species are described: *genjam, manokwari, longipennis, rubra* and *glabra*. Some species, preliminarily allocated to *Cranae*, link the genus along various lines with the genera *Cranaella* and *Opiptacris*.

Introduction

Cranae and some related genera form a large, natural group of species, each with a very restricted range. Few characters have been used for the generic distinction. When more characters are analyzed simultaneously, the present generic classification appears largely artificial and certainly does not reflect a hypothetical phylogeny. Several species, along various lines, link the discontinuities between the genera. A generic revision is needed but material is scarce and much basic information on the species concerned is wanting. Therefore, it appears sensible to retain *Cranae* preliminarily as a taxonomic unit in its present state. Depositories of the material used in this study are given in abbreviated form throughout the text:

ANSP — Academy of Natural Sciences of Philadelphia
BPBM — Bernice P. Bishop Museum, Honolulu
ITZ — Instituut voor Taxonomische Zoölogie, Amsterdam
MC — Macdonald College, Quebec, Canada
MNHN — Muséum National d'Histoire Naturelle, Paris
NMM — Natuurhistorisch Museum, Maastricht
NMW — Naturhistorisches Museum, Wien
RNH — Rijksmuseum van Natuurlijke Historie, Leiden
ZMHU — Zoologisches Museum der Humboldt-Universität, Berlin

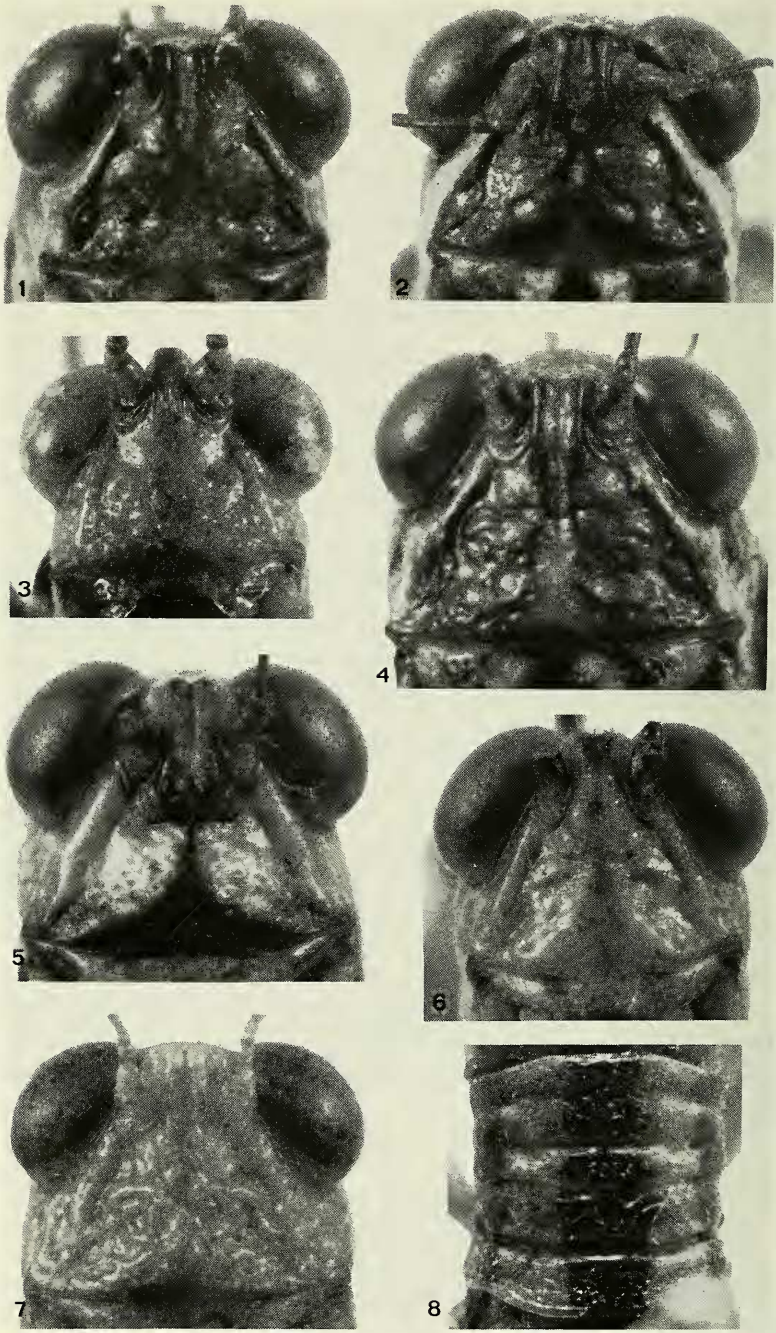


Plate 1. Figs. 1—7. *Cranae* species, face, frontal view, similar scale: 1, *patagiata* Stål, ♀ (type of *C. pervittata* Brunner); 2, *unistrigata* (De Haan) Form 1, ♀ (Aindoea R.); 3, *nigroreticulata* Brunner, ♂ (Tuguaer-Tasso); 4, *longipennis* sp.n., ♀ (allotype); 5, *luctuosa* C. Bolívar, ♀ (Telega, Obi I.); 6, *glabra* sp.n., ♀ (paratype); 7, *pictipennis* C. Willemse, ♀ (paratype). Fig. 8. *C. patagiata* Stål, ♂ (type of *C. pervittata* Brunner), pronotum, dorsal view.

My thanks are due to the following persons: J. L. Gressitt and the late Miss S. Nakata, Honolulu; M. Beier, Vienna; K. K. Günther, Berlin; P. H. van Doesburg, Leiden; M. Descamps, Paris; D. K. McE. Kevan, Macdonald College; H. Radclyffe Roberts and D. Rentz, Philadelphia; and especially to C. Jeekel, Amsterdam, for reading the manuscript and for his critical comments.

Cranae Stål, 1878

Cranae Stål, 1878: 41, 85; Brunner, 1893: 135; 1898: 236; Kirby, 1910: 387; C. Willemse, 1921: 7, 21; C. Bolívar, 1932: 393; Uvarov, 1937: 17; C. Willemse, 1939: 74; Ramme, 1941: 87; C. Willemse, 1956: 9,97.

Type-species: *Cranae patagiata* Stål, 1878.

A diagnosis, based on the revised material, reads as follows:

Medium size. Integument shiny. Face and pronotum more or less pitted or almost smooth, face occasionally more or less wrinkled. Occiput, on either side, with a row of slight transverse impressions.

Antennae filiform, segments up to five times as long as wide, tip reaching nearly middle of hind femur or slightly longer. Head thick, round. Eyes ovoid-hemispherical. Interocular distance as wide as or a little narrower than greatest width of fastigium verticis. Distance between eye and lower margin of cheek much shorter than vertical diameter of eye. Fastigium verticis at lower level than vertex between eyes, usually slightly marked off from rest of vertex; sometimes with fine median sulcus and fissured apex, merging with sulcus of frontal ridge; more or less widely triangular from above, truncated apex more or less wide and not reaching tip of scape; in profile, from subhorizontal to distinctly declivous, about rectangularly meeting face. Face (pl. 1 figs. 1—7) slightly reclinate. Frontal ridge present only above the median ocellus, weakly sulcate; margins obtuse, nearly parallel, sometimes connected transversely at median ocellus. Lateral facial keels straight, low, more or less divergent; face, along these keels, depressed in some species. Occiput and cheeks convex.

Pronotum (pl. 1 fig. 8, pl. 2 fig. 9—16) about as long and as wide as head or slightly shorter or narrower, without keels, cylindrical or dorsum slightly depressed from above, lateral lobes parallel or slightly compressed laterally in the middle. Four transverse sulci, more or less deep, second one dorsally only. Dorsum divided by the sulci into five parts; width of these parts varying individually, but distance between second and third sulci usually slightly smaller, that between third and fourth sulci usually slightly larger. Lateral lobe about as long as high or shorter; deepest point at level of third sulcus, from there lower margin concave anteriorly, straight or slightly convex posteriorly; anterior angle obtuse-angulate, posterior angle about rectangular, from narrowly rounded to obtusely pointed. Anterior margin of dorsum weakly rounded, of lateral lobe straight and divergent anteriorly. Posterior margin of dorsum weakly rounded, straight or weakly emarginate, of lateral lobe straight or slightly concave, vertical or slightly slanting upwards posteriorly. Prosternal process strong, more or less

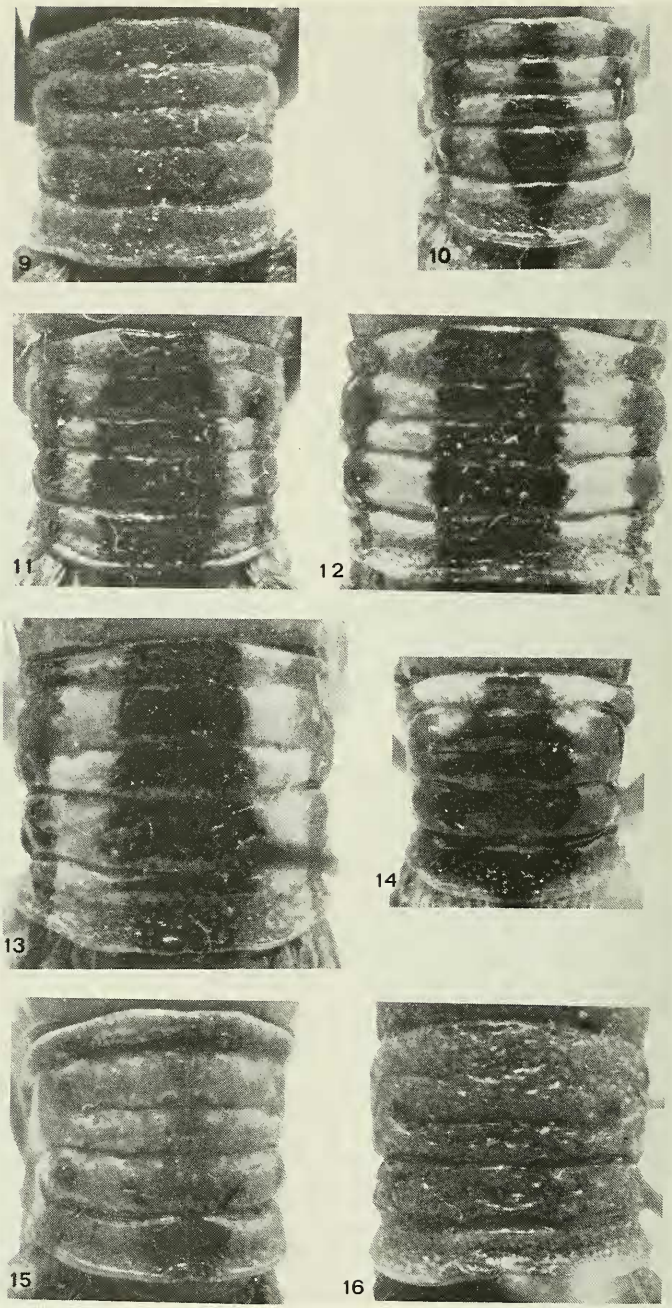


Plate 2. Figs. 9—16. *Cranae* species, pronotum, dorsal view, similar scale: 9, *tibialis* Brunner, ♂ (holotype); 10, *nigroreticulata* Brunner, ♂ (Tuguaer-Tasao); 11, *unistrigata* (De Haan), Form 1, ♂ (Fak Fak, T.C. Maa); 12, *trivittata* C. Willemse, ♀ (Bivak Eiland); 13, *rufipes* Ramme, ♀ (Finschhafen); 14, *luctuosa* C. Bolívar, ♂ (Telaga, Obi I.); 15, *glabra* sp.n., ♀ (paratype); 16, *pictipennis* C. Willemse, ♂ (allotype).

laterally compressed, in profile vertical or slightly directed anteriorly; truncated apex widened laterally, its anterior margin straight and posterior margin curved towards anterior one. Mesosternal lobes wider than long, inner margins convex, interspace wider than long, about as wide as a lobe. Metasternal interspace narrowly triangular. Mesonotum about two-thirds of metanotal length. Metanotum narrower than distance between anterior margin of pronotum and second pronotal sulcus.

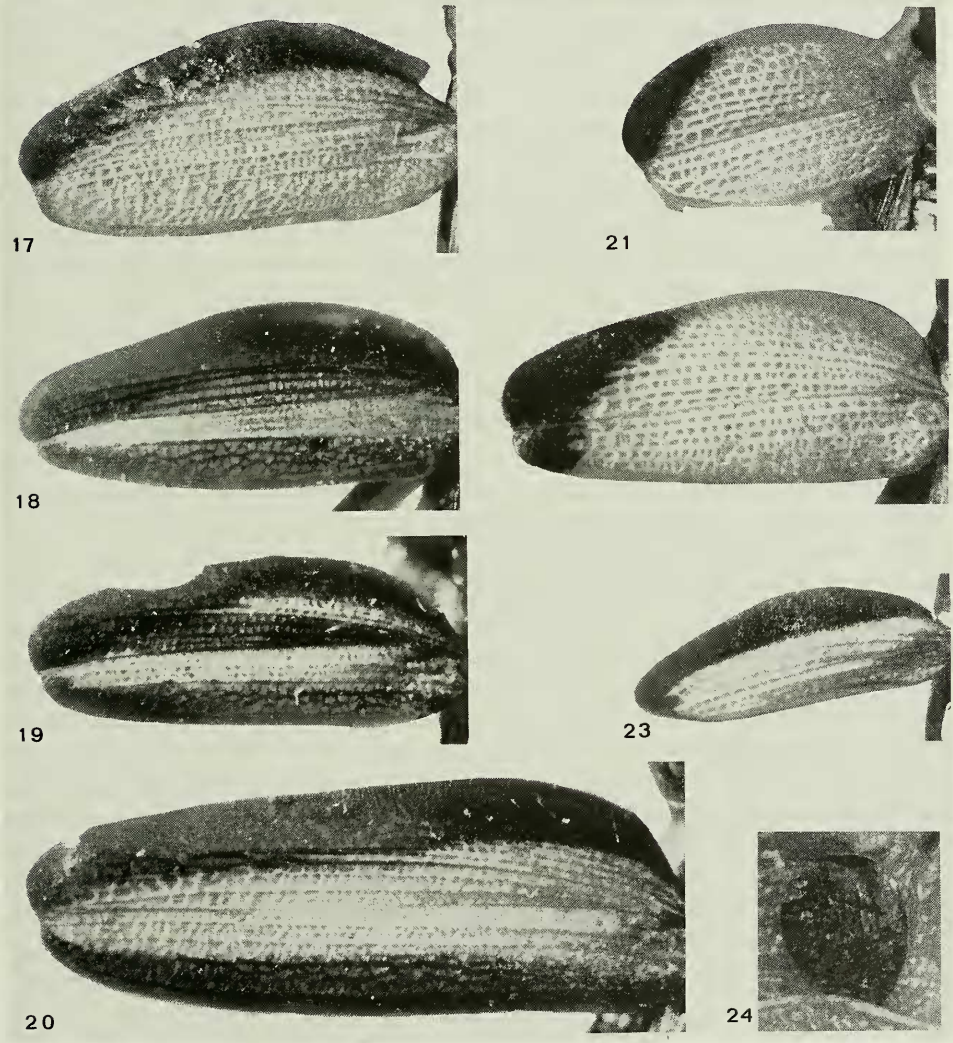


Plate 3. Figs. 17—24. *Cranae* species, spread left elytron, outer view, similar scale: 17, *patagiata* Stål, ♀ ('Java'); 18, *unistrigata* (De Haan), Form 1, ♀ (Aindoea R.); 19, *manokwari* sp.n., ♀ (allotype); 20, *longipennis* sp.n., ♀ (allotype); 21, *kuekenthali* Brunner, ♀ (Halmaheira, T. Barbour); 22, *luctuosa* C. Bolívar, ♀ (Telaga, Obi I.); 23, *glabra* sp.n. ♀ (paratype); 24, *pictipennis* C. Willemse, ♀ (holotype) (in situ)

Tegmina (pl. 3 fig. 17—24) from squamipterous to subbrachypterous, ranging from reaching first up to ninth abdominal tergite. Elytra touching each other or more or less separated dorsally; from almost as long as wide to three times as long as wide; posterior margin from straight to strongly rounded; anterior margin more or less evenly rounded or tapering in apical half; apex, at the end of folding of elytron, divided into a larger anterior and a smaller posterior lobe (except *glabra* and *pictipennis*); venation simple, a wider zone along the anterior and a much narrower one along posterior margin without veins. Hind wing slightly shorter than elytron, with sparse veins (as a small, membraneous fold in *pictipennis*). Tympanum open, almost circular, level with the body surface (as a closed, narrow furrow in *pictipennis*).

Legs stout (attenuate in *glabra*). Hind femur about reaching tip of abdomen (male), or slightly shorter (female); fishbone pattern distinct and smooth, keels smooth or slightly crenulate, inner lower carinula pilose. Knee-lobes truncate. Brunner's organ present. Hind tibia slightly shorter than hind femur; margins rounded, strongly pilose; six or seven inner and four or five outer spines regularly arranged, apical ones included. Hind tarsus pilose, slightly longer than half the tibial length, third segment longest, first and second segments of about equal length.

Male. — Hind margin of last abdominal tergite (fig. 5) triangularly excised with a pair of well-separated, small, widely triangular furculae. Supra-anal plate (fig. 5) wider than long, roughly triangular; lateral margins thickened near base and there with a short, low, transverse ridge, extending medially; middle of basal half depressed; apex more or less widely parabolic. Cercus slender, slightly up- and incurved, pointed apex reaching or extending beyond tip of subgenital plate. The latter subconical, short and its apex obtuse.

Phallic complex, figs. 6—45. Epiphallus narrowly bridge-shaped; ancorae, in most species, more (fig. 7) or less (fig. 14) joined with lateral plates, in few species present as a separate projection (fig. 11); inner lophi smaller and tooth-shaped, outer lophi larger and hook-shaped. Ectophallic membrane with shield-shaped dorsal sclerite. Cingulum with narrowly U-shaped apodemal structure. Rami extending latero-ventrally and dorso-posteriorly; usually narrow (fig. 9), but in some species wider (fig. 13). Cingular valves short, not by far reaching tip of apical penis valves, triangular from above. Apical penis valves slightly upcurved and joining laterally with sheath of penis. Apex of phallus formed by sheath of penis and projecting ends of apical penis valves. Shape of apex of phallus variable but species-specific (figs. 16—45).

Female. — Hind margin of last abdominal tergite triangularly excised. Supra-anal plate tongue-like, twice as long as wide, apex parabolic. Cercus conical, slightly outcurved, not reaching tip of supra-anal plate. Subgenital plate (fig. 1) twice as long as wide, ventral surface flattened in the middle and, usually, rather depressed or sulcated apically between a pair of short, obtuse, longitudinal keels; hind margin slightly sigmoid laterally, tridentate in the middle, median point longest and widest, lateral points corresponding with distal ends of ventral keels. Dorsal aspect of subgenital plate (fig. 3) with a pair of simple, round columellae.

Valves of ovipositor (fig. 2) slender, straight, margins finely serrate or almost smooth, apices not definitely hooked. Lateral basivalvular sclerite elongate-triangular, ventral basivalvular sclerite three to four times as long as wide. Spermatheca (fig. 4) simple, with an apical diverticulum and a wider, strongly curved, preapical diverticulum.

Coloration. Most species characteristically coloured. Sexual dichromatism not apparent. Individual variation appearing to be slight, but a general statement not possible by lack of material. Coloration of the following parts similar in all taxa of the genus: eyes, individually, from yellow to dark brown; apical part of mandible black; crescents of hind knee dark castaneous brown; spines of hind tibia and claws of tarsus dark brown or blackish, tips black; furculae in the male black.

General distribution: New Guinea and the Moluccas.

Discussion. Previously, ten species and three subspecies have been placed in *Cranae* (C. Willemse, 1956). Now at least 20 species are recognized. *Opiptacris pictipennis* (C. Willemse) has been re-established to its original combination *Cranae pictipennis* (F. Willemse, 1975: 121). *Cranae rufofemorata* C. Willemse and its variety *obscura* are both considered conspecific with *Cranae tibialis* Brunner. *Cranae patagiata coerulipes* (C. Bolivar) is considered conspecific with *Cranae patagiata* Stål. The available material clearly shows that *Cranae unistrigata* (De Haan) and *trivittata* C. Willemse belong to a complex of closely related populations. Two of these have been described by Ramme, as *caprai* and *trivittata rufipes*, respectively. Whether *caprai* should be considered taxonomically distinct from nominate *unistrigata* is an open question. However, *rufipes* is now given specific rank. As to the remaining material resembling nominate *unistrigata* and *trivittata,* it is still hard to decide whether speciation has been completed or not. In two cases only differences seem sufficient for distinction on species level: *genjam* and *manokwari.* Eight additional species are recognized as new. Three are fully described and named: *longipennis, rubra* and *glabra.* The others could not be defined precisely enough, by lack of males. They are briefly recorded, but not yet named.

In *Cranae*, some natural species groups can be distinguished. The main stock of the genus is found on New Guinea. It is formed by the *unistrigata* complex. The following groups among *Cranae* may be recognized: (1) nominate *unistrigata, genjam,* and (probably) the not fully known species from Roon I. and Sabang; (2) *trivittata, rufipes, manokwari* and (probably) the not fully known species from Bubia and Normanby I.; (3) *rubra;* (4) *longipennis* and (probably) the not fully known species from Aseki; (5) *patagiata, tibialis;* (6) *nigroreticulata;* (7) species with important discontinuity as *kuekenthali, luctuosa, glabra,* and *pictipennis.* Especially the latter group of species links, through various characters, *Cranae* with *Cranaella* Ramme and *Opiptacris* Walker.

Key to the species of *Cranae* (*emendata* Brunner and the now recognized but not yet named new species omitted):

1. Elytron circular and not reaching beyond the first abdominal tergite (pl. 3 fig. 24); tympanum closed (Buru) . . . . . *pictipennis* C. Willemse (p. 149)

— Elytron elongate and reaching beyond the first abdominal tergite (pl. 3 figs. 17—23); tympanum open, circular 2
2. Elytron unicolorous olivaceous green, without black (Kei Is.) . . . . . *tibialis* Brunner (p. 132)
— Elytron with at least the anterior margin and the apex bordered with black or dark brown 3
3. Elytron red and black 4
— Elytron without red 5
4. Hind femur red on basal half (Woodlark I) . . . . . *rubra* sp.n. (p. 144)
— Hind femur not red (Ambon; Ceram) . . . . . *patagiata* Stål (p. 128)
5. Elytron not reaching beyond the second abdominal tergite (pl. 3 fig. 23) (Biak I.) . . . . . *glabra* sp.n. (p. 147)
— Elytron longer (pl. 3 fig. 17—22) 6
6. Pronotum cylindrical, without longitudinal fasciae (pl. 2 fig. 14); phallic complex with the rami wide (fig. 13) 7
— Pronotum slightly depressed from above, with longitudinal fasciae (pl. 2 figs. 10—13); phallic complex with the rami narrow (fig. 9) 8
7. Hind femur orange on basal half (Halmahera) . . *kuekenthali* Brunner (p. 145)
— Hind femur not orange on basal half (Obi I.) . . *luctuosa* C. Bolívar (p. 146)
8. Median black fascia of pronotal dorsum rhomboidally widened in the middle (pl. 2 fig. 10) (Halmaheira) . . . . . *nigroreticulata* Brunner (p. 135)
— This fascia not widened in the middle (pl. 2 figs. 11—13) 9
9. Elytron wide and long, margins about parallel, the yellow streak wide (pl. 3 fig. 20) (S. New Guinea) . . . . . *longipennis* sp.n. (p. 142)
— Elytron shorter, tapering apically, the yellow streak narrow (pl. 3 figs. 18—19) 10
10. Yellow antegenicular ring of hind femur bordered proximally with red or orange 11
— This ring bordered proximally with a narrow black ring, either complete or not 12
11. Apex of phallus short (figs. 22—23) (Genjam, near Hollandia) . . . . . *genjam* sp.n. (p. 140)
— Apex of phallus elongate (figs. 24—31) (W & N. New Guinea) . . . . . *unistrigata* De Haan (p. 135)
12. Pronotum shorter, dorsum more depressed (pl. 2 fig. 12); head more globose (SW. New Guinea) . . . . . *trivittata* C. Willemse (p. 140)
— Pronotum longer, dorsum less depressed (pl. 2 fig. 13); head less globose (N. New Guinea) . . . . . *rufipes* Ramme (p. 141) and *manokwari* sp.n. (p. 142)

Cranae patagiata Stål, 1878

(figs. 1—2, 5—10, 16—17, pl. 1 figs. 1, 8, pl. 3 fig. 17, pl. 4 fig. 25)

Cranae patagiata Stål, 1878: 85; Brunner, 1898: 236; Kirby, 1910: 387; Sjöstedt, 1932: 62; C. Willemse, 1939: 74; Ramme, 1941: 87, 88; C. Willemse, 1956: 104 (not Brit. N. Guinea).
Cranae patagiata patagiata; C. Willemse, 1956: 99.

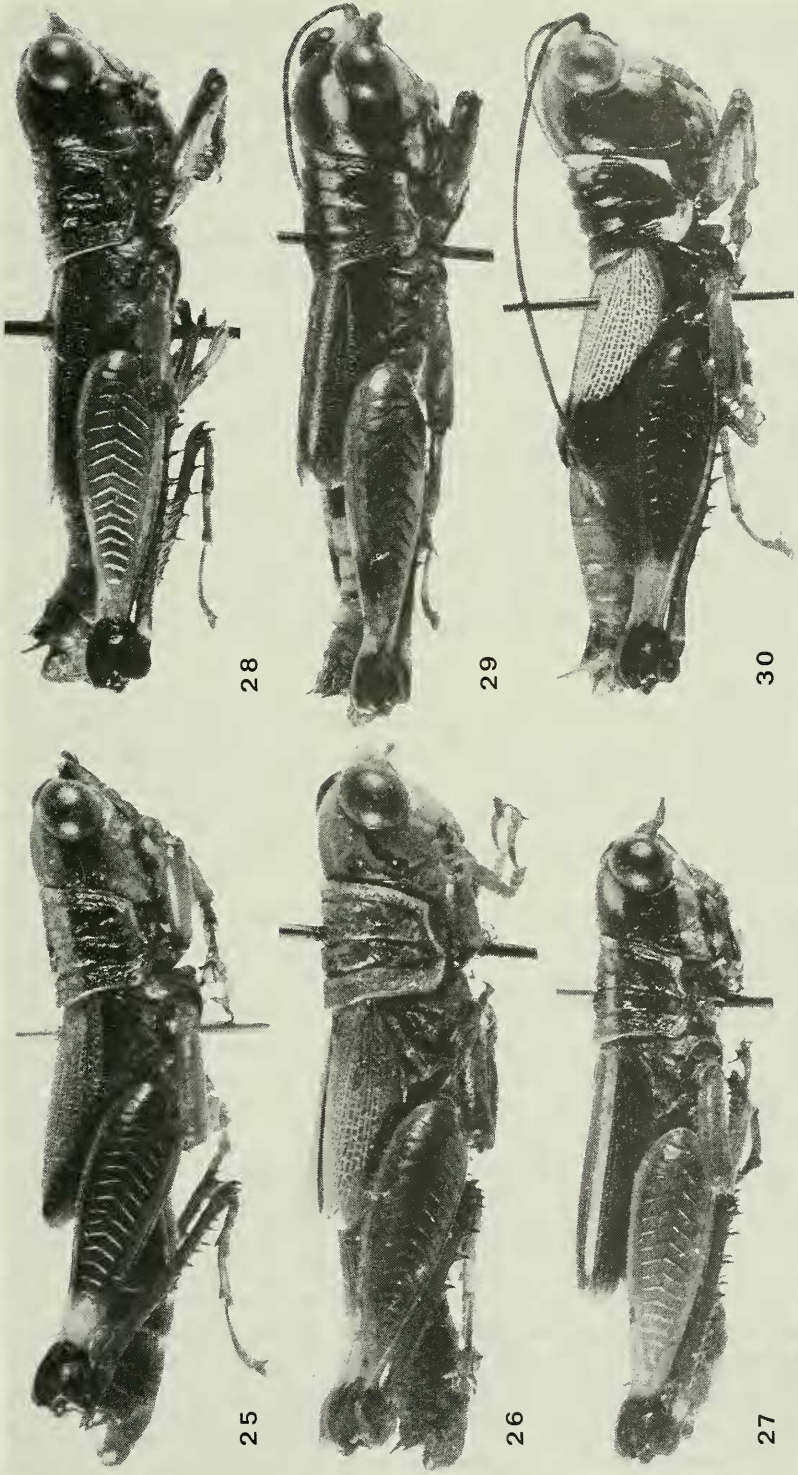


Plate 4. Figs. 25—30. *Cranae* species, lateral view: 25, *patagiata* Stål, ♂ (type of *C. pervittata* Brunner); 26, *tibialis* Brunner, ♂ (paratype of *C. rufofemorata* C. Willemse); 27, *unistrigata* (De Haan), ♂ (holotype); 28, *genjam* sp.n., ♂ (holotype); 29, *manokwari* sp.n., ♂ (holotype); 30. *luctuosa* C. Bolívar, ♂ (Telaga, Obi I.).

Cranae pervittata Brunner, 1898: 236, 238; Kirby, 1910: 387; C. Willemse, 1922: 716; C. Bolívar, 1923: 146; C. Willemse, 1939: 74; Ramme, 1941: 88 (synonymy established); C. Willemse, 1956: 104 (in synonymy only).

Cranae pervittata pervittata; C. Bolívar, 1923: 147; C. Willemse, 1939: 74.

Cranae pervittata coerulipes C. Bolívar, 1923: 147; C. Willemse, 1939: 74. **Syn. nov.**

Cranae patagiata coerulipes: Ramme, 1941: 88 (nec *coerulescens*); C. Willemse, 1956: 99, 105; Kevan, 1966: 411.

Material studied: ♂ lectotype, ♀ paralectotype of *Cranae patagiata*, labelled: Col. Br. v. W. Amboina, 1258, det. Br. v. W. *Cranae patagiata* (NMW). Both specimens discoloured.

Types of *Cranae pervittata*, 1♂ 1♀, labelled: Coll. Br. v. W. Amboina Staudinger, 14.141, Det. Br. v. W. *Cranae pervittata*, Type, *Cranae patagiata* Stål Ramme det. 1939 (NMW).

Additional material: Amboina, Dr. Doleschal, 1859 (2♂, 2♀, discoloured) (NMW); Molukken, Depuiset ded., 5043, det. Br. v. W., *Cranae pervittata* (1♀) (NMW); Amboine, Moluques, Collection Brunner, *Cranae patagiata* Stål, collection A. Finot (1♂, 1♀, discoloured) (MNHN); Amboine, Collection A. Finot, *Cranae pervittata* Br. (1♂) (MNHN); Ceram, Piroe (1♂) (ZMHU); Ceram, Piru, F. Barbour, 1906-07 coll. (1♀, discoloured) (ANSP); Java, Oberth., ex coll. Bolívar, *Cranae patagiata,* det. C. Willemse (1♀) (NMM).

Redescription.

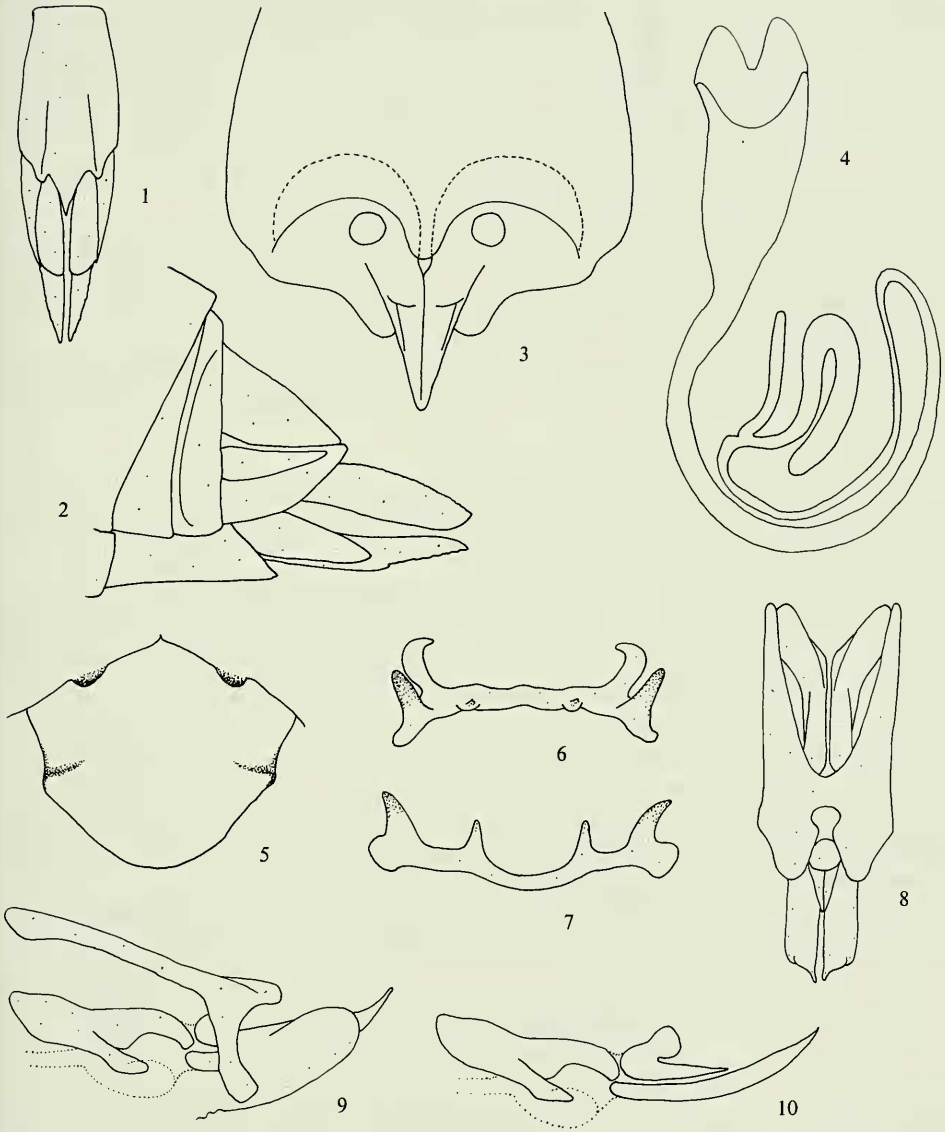
Male, pl. 4 fig. 25. Face and thorax slightly pitted. Interocular distance less than greatest width of fastigium verticis. Fastigium verticis triangular, greatest width and length about equal, finely sulcate apically, in profile slightly declivous. Frontal ridge with low margins, below median ocellus disappearing into slightly wrinkled surface of face. Face slightly transversely convex, weakly impressed along lateral keels.

Pronotum (pl. 1 fig. 8) as long and as wide as head, slightly depressed from above, lateral lobe parallel; sulci moderate; posterior margin of dorsum slightly extending posteriorly, straight or very slightly rounded; lateral lobe as long as high, posterior angle narrowly rounded, posterior margin straight and vertical.

Elytron reaching middle of hind femur, about three times as long as wide, posterior margin straight, anterior margin strongly rounded basally, tapering apically towards the widely rounded, divided apex. Both elytra touching each other apically, narrowly separated basally.

Supra-anal plate (fig. 5) with the apex widely parabolic. Furculae (fig. 5) very small, well separated. Cerci reaching tip of subgenital plate. Phallic complex, figs. 6—10, 16—17. Ancorae of epiphallus joined with lateral plates. Cingular rami narrow. Apex of phallus with moderately developed sheath of penis and short, strongly tapering apical penis valves, their tips almost pointed.

Coloration olivaceous yellow, dark bluish-black and red. Antennae dark brown, paler apically. Head and pronotum olivaceous yellow with three bluish-black fasciae: on either side, from behind eye over middle part of pronotal lateral lobe and a median fascia from between the eyes over occiput and pronotal dorsum; margins of fastigium verticis and frontal ridge, lateral facial keels and larger or



Figs. 1—2. *Cranae patagiata* Stål, ♀ (type of *C. pervittata* Brunner): 1, tip of abdomen, ventral view; 2, same, lateral view. Figs. 3—4. *Cranae unistrigata* (De Haan), Form 6, ♀ (Hollandia): 3, subgenital plate, dorsal view; 4, spermatheca. Figs. 5—10. *Cranae patagiata* Stål, ♂ (type of *C. pervittata* Brunner): 5, furculae and supra-anal plate; 6, epiphallus, dorsal view; 7, same, posterior view; 8, phallic complex. dorsal view, epiphallus and part of ectophallic membrane removed; 9, same, lateral view; 10, same, endophallus.

smaller areas of face, bluish or greenish-black; episternum, meso- and metathorax blackish, except for yellowish lower part of second episternum and epimerum.

Elytron dull red, anterior margin and apex widely bordered with black. Hind wing infumate. Abdomen violaceous brown and yellowish. Fore and middle femora dull red, apical margins of knees, whole tibiae and tarsi olivaceous green and yellow. Hind femur ranging from violaceous black to yellowish; in the former case, dorsal side yellowish, in the latter one, carinulae and fishbone pattern black. Antegenicular part of hind femur, as long as length of hind knee, yellow. Hind knee, tibia and tarsus dark bluish-green; hind tibia with a narrow, indistinct, greenish postgenicular ring; hind tarsus paler below.

Female. Larger than male. Face, pl. 1 fig. 1. Elytra (pl. 3 fig. 17) more widely separated dorsally and reaching distal end of basal third of hind femur, about two-and-one-half times as long as wide. Abdominal terminalia, figs. 1—2. Subgenital plate distinctly sulcate apically. Coloration as in male.

Measurements (length in mm): body, ♂ 22.0-23.0 ♀ 27.0—30.0; pronotum, ♂ 4.2—4.5, ♀ 5.2—5.8; elytron, ♂ 8.2—8.8, ♀ 7.6—8.9; hind femur, ♂ 11.7—12.2, ♀ 13.6—14.9.

Distribution: Moluccas (Ambon, Ceram).

Discussion. The species is well-defined, especially by the phallic complex and the coloration. The apex of phallus comes close to that of *tibialis* and *genjam*. The coloration of the elytron is much as in *rubra*.

The discoloured pair, bearing Brunner's identification label *patagiata*, lacks any type indication. In agreement with the original paper, the record by Sjöstedt (1932) and Ramme's opinion (1941), the pair should be considered Stål's types. The male is hereby designated **lectotype**. Ramme synonymized Brunner's *pervittata* with Stål's *patagiata*. Comparison of the phallic complex definitely reveals their synonymy. Bolívar's *pervittata coerulipes* from Ceram is defined by slightly distinct coloration. However, this character is not reliable as among *patagiata* material from Ambon (MNHN) a transitional form is also found. Besides, genitalia and other characters are very similar and the localities quite close. Bolívar's *coerulipes* is considered conspecific with *patagiata*.

The previous records from British New Guinea (material not at hand) and Java (1 ♀ at hand) are probably incorrect. As to the former, see below under *rubra*.

Cranae tibialis Brunner, 1898
(figs. 18—19, pl. 2 fig. 9, pl. 4 fig. 26)

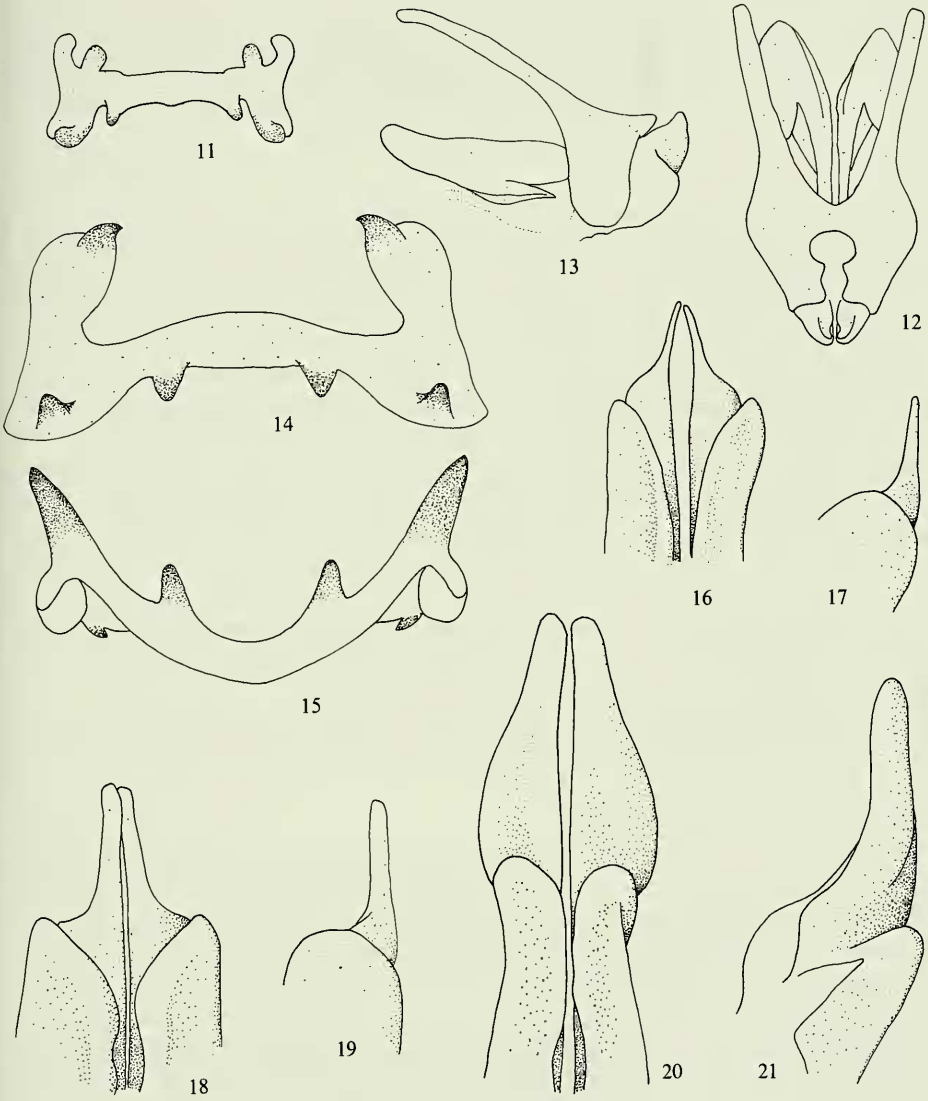
Cranae tibialis Brunner, 1898: 236, 237; Kirby, 1910: 287; C. Willemse, 1939: 74; 1956: 98, 99.

Cranae rufofemorata C. Willemse, 1939: 73, 74, fig. 1; 1956: 98, 100, fig.: F. Willemse, 1966a: 38; 1966b: 65. **Syn. nov.**

Cranae rufofemorata var. *obscura* C. Willemse, 1956: 98, 101; F. Willemse, 1966a: 38; 1966b: 65. **Syn. nov.**

Material studied: ♂ holotype of *Cranae tibialis*, labelled: Coll. Br. v. W. Key-Inseln Ribbe leg., det. Br. v. W. *Cranae tibialis*, Type (NMW). The specimen lacks both antennae; right tegmina are spread.

Type-series of *Cranae rufofemorata*, labelled: H. C. Siebers Kei Eil., Gn. Daab



Figs. 11—13. *Cranae kuekenthali* Brunner, ♂ (paratype): 11, epiphallus, dorsal view; 12, phallic complex, dorsal view, epiphallus and part of ectophallic membrane removed; 13, same, lateral view. Figs. 14—15. *Cranae longipennis* sp.n., ♂ (holotype): 14, epiphallus, dorsal view; 15, same, posterior view. Figs. 16—21. *Cranae* species, ♂, tips of apical penis valves and sheath of penis, ventro—posterior (even numbers) and left lateral (odd numbers) view, similar scales: 16—17, *patagiata* Stål (type of *C. pervittata* Brunner); 18—19, *tibialis* Brunner (paratype of *C. rufofemorata* C. Willemse); 20—21, *nigroreticulata* Brunner (Tuguaer—Tasao).

143 (♂ holotype) & 138 (1♂ paratype) & Toeal 201 (1♂ paratype, ♀ allotype), *Cranae rufofemorata* n.sp. C. Willemse det. (Holo- and allotype RNH, paratypes NMM). The holotype lacks both antennae.

Type-series of *Cranae rufofemorata* var. *obscura*, labelled: H. C. Siebers Kei Eil. Gn. Daab 85 (♀ holotype) & 135 (♀ paratype), *Cranae rufofemorata* Will. var. *obscura* n.var. Det. C. Willemse (NMM). The holotype lacks the right antenna and both fore legs.

Redescription

Male, pl. 4 fig. 26. Differs from type-species in pronotum, apex of phallus and coloration. Pronotum (pl. 2 fig. 9) more cylindrical, slightly wider, sulci slightly deeper, posterior margin extending less posteriorly and lateral lobe narrower. Apex of phallus (figs. 18—19) slightly larger, sheath of penis more developed, apical penis valves more narrowing apically and tips larger.

Coloration as described by C. Willemse (1956) under *rufofemorata* and its variety *obscura*. Marked characters may be summarized as follows: head from yellowish or yellowish-green to almost completely dark olivaceous; pronotum from yellowish-brown to blackish-brown, in the latter case with the margins yellowish-brown; elytron completely yellowish or greenish; legs red, except for hazel brown hind knees with blackish lobes, a yellowish-green antegenicular ring of hind femur, dark brownish or violaceous apical third of hind tibia, and brownish or greenish tarsi.

Female. Larger than male. Abdominal terminalia as in type-species. Coloration as in male, except for hind femur, which is yellowish-green with lower inner marginal area red.

Measurements (length in mm): body, ♂ 21.0—22.0, ♀ 31.0—35.0; pronotum, ♂ 4.0—4.3, ♀ 5.2—5.4; elytron, ♂ 7.7—8.0, ♀ 7.5—8.2; hind femur, ♂ 11.3—12.5, ♀ 14.2—15.2.

Distribution: Moluccas (Kei Is.).

Discussion: The species is well-defined, especially by the apex of phallus and the coloration. Apex of phallus much as in *patagiata* and *genjam*. The unicolorous elytra without black forming a particular feature of the species. Shape and coloration of the pronotum intermediate between *patagiata* and the *kuekenthali-luctuosa* group.

As against the original statement and in agreement with the given measurements, the holotype is not a female but a male. Comparison of the holotype of *tibialis* with the males of the type-series of *rufofemorata*, clearly reveals their synonymy. C. Willemse distinguished among *rufofemorata*, the variety *obscura*. It was based on the dark olivaceous green head and pronotum in two females of the type-series of *rufofemorata*. However, this character is not reliable, as the colour of head and pronotum in males of nominate *rufofemorata* ranges from pale olivaceous green to as dark as in *obscura*. The darkest male of nominate *rufofemorata* is the holotype (RNH). C. Willemse's distinction may be explained by assuming that this holotype was not before him when he described the variety (1956). By lack of distinct features, I consider *obscura* conspecific with *rufofemorata* as well as with *tibialis*.

Cranae nigroreticulata Brunner, 1898
(figs. 20—21, pl. 1 fig. 3, pl. 2 fig. 10)

Cranae nigroreticulata Brunner, 1898: 198, 236, 239; Kirby, 1910: 387; C. Willemse, 1922: 715; 1939: 74; Ramme, 1941: 90; C. Willemse, 1956: 98, 101.
Cranae marginata Brunner, 1898: 198, 236, 237 (partim); Kirby, 1910: 387 (do); Ramme, 1941: 87, 90 (♀ synonymy established); C. Willemse, 1956: 101 (in synonymy only).

Material studied: 1 ♂, labelled: Halmahera, Tuguaer-Tasoa, 100-150 m, 20 ix. 1951 (1♂) (NMM).

Redescription

Male. Differs from the type-species in head, pronotum, abdominal terminalia, and coloration. Fastigium verticis narrowly triangular, apex not fissured, in profile subhorizontal. Face (pl. 1 fig. 3) more pitted, not wrinkled, more transversely convex, lateral keels lower. Frontal ridge weaker. Pronotum (pl. 2 fig. 10) narrower, sulci slightly wider and posterior margin of lateral lobe slightly concave.

Furculae larger, more pointed and closer together. Supra-anal plate shorter, apex wider and transverse ridges more distinct. Apex of phallus larger and more elongate (figs. 20—21); sheath of penis narrow; apical penis valves wider and less tapering apically.

Coloration as described by C. Willemse (1956). Marked characters may be summarized as follows: head yellow; pronotum orange-yellow, dorsum with a black median fascia, in the middle rhomboidally widened, lateral lobe with a black fascia in upper part; elytron yellowish, anterior margin narrowly, apex widely bordered with black; fore and middle legs orange-yellow with some black markings; hind femur orange-yellow with carinae, carinulae and fishbone pattern black, antegenicular area completely orange-yellow; hind knee black; hind tibia and tarsus violaceous black.

Female. Not studied.

Measurements were given in previous papers.

Distribution: Moluccas (Halmahera).

Discussion. The species is well-defined by the face, apex of phallus and coloration. The pitted and not wrinkled face and the rhomboidal figure of the pronotal dorsum are unique in *Cranae*. The apex of phallus agrees with *unistrigata* rather than with *patagiata*.

Type-material of *Cranae marginata* was not at hand. No comments are given as to the synonymic notes in Ramme (1941).

Cranae unistrigata (De Haan, 1842)
(figs. 3—4, 24—31, pl. 1 fig. 2, pl. 2 fig. 11, pl. 3 fig. 18, pl. 4 fig. 27)

Acridium (Oxya) unistrigatum De Haan, 1842: 143, 156, 158, 246, pl. 21 figs. 7—7a (♂), 8 (juv. ♂, not ♀); I. Bolívar, 1918: 42 (juv. ♂, not ♀); C. Willemse, 1928: 11.
Acridium unistrigatum; Stål, 1873: 53.
Oxya unistrigata; Walker, 1870: 648.
Oxya (?) *unistrigata;* Kirby, 1910: 395 (juv. ♂, not ♀).

Taeniophora unistrigata; Bruner, 1907: 245, 247.
Chitaura haani I. Bolívar, 1918: 34 (juv. ♂, not ♀); C. Willemse, 1956: 106 (in synonymy only).
Cranae unistrigata; I. Bolívar, 1898: 88; Kirby, 1910: 387; C. Willemse, 1922: 716; 1932: 46; 1939: 75; Ramme, 1941: 87, 90; C. Willemse, 1956: 99, 106 (not Sabang); Kevan, 1966: 411 (not Roon I).

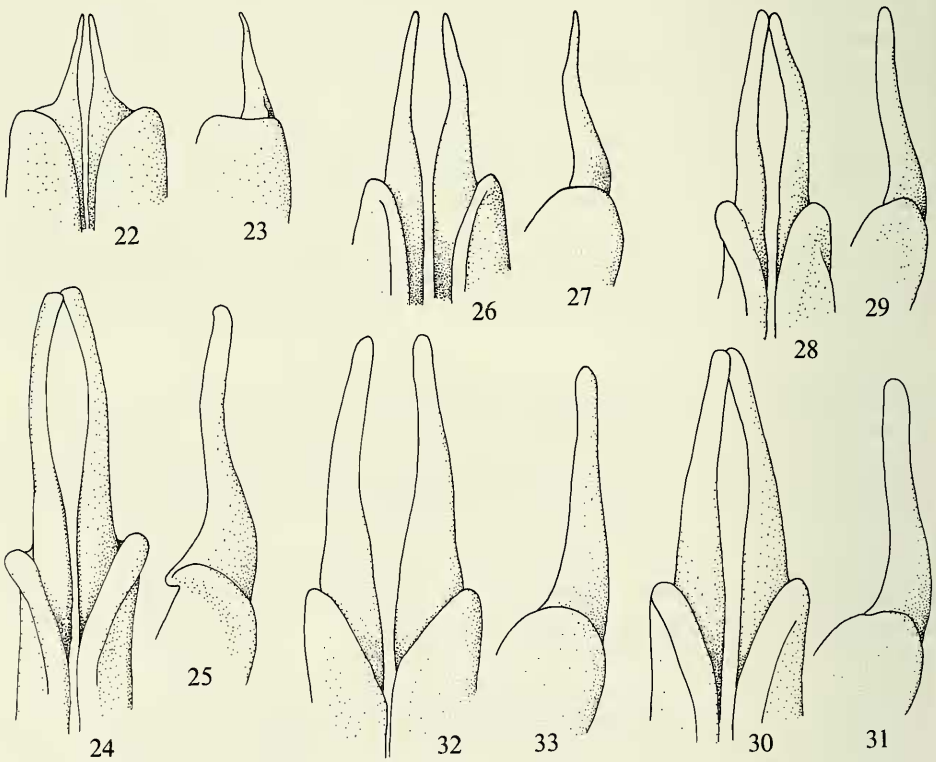
Material studied: ♂ holotype, labelled: N. Guinea, Type, *Cranae unistrigata* De Haan ♂ Det. C. Willemse (RNH). The specimen lacks the left antenna and right fore leg.

Redescription of the holotype.

Male, pl. 4 fig. 27. Differs from the type-species in head, pronotum, elytron, abdominal terminalia and coloration.

Head slightly more globose. Face wider. Lateral facial keels and margins of frontal ridge more raised. Interocular distance wider. Fastigium verticis more widely triangular, more declivous, and apex wider and not fissured.

Pronotum (pl. 2 fig. 11) slightly wider, dorsum more depressed and sulci less



Figs. 22—33. *Cranae* species, ♂, tips of apical penis valves and sheath of penis, ventro-posterior (even numbers) and left lateral (odd numbers) view, similar scales; 22—23, *genjam* sp.n. (holotype); 24—25, *unistrigata* De Haan (holotype); 26—27, *unistrigata* (De Haan), Form 2 (Sorong); 28—29, *unistrigata* (De Haan), Form 4 (Jobi I.); 30—31, *unistrigata* (De Haan), Form 6 (Adelbert Mts.); 32—33, *rufipes* Ramme (?) (Toricelli Mts.).

wide. Elytron narrower and longer, reaching just beyond middle of hind femur. Furculae larger. Apex of phallus (figs. 24—25) longer and much more elongate; apical penis valves narrow, very slightly tapering apically, tips obtuse.

Coloration olivaceous green, yellow and black. Antennae dark brown. Head black except for olivaceous face and mouthparts, yellow fastigium verticis, a yellow sharply delimited, ovoid spot on the occiput near the dorso-posterior margin of each eye and a yellow narrow fascia from the antennal base along anterior margin of eye and lower margin of cheek.

Pronotum yellow with three black fasciae: a median one over the dorsum, twice as wide as each yellow lateral part of the dorsum and, on either side, over the upper two-thirds of lateral lobe. Meso- and metathorax yellowish, except for first episternum, upper part of pleurae and lateral parts of meso- and metasterna, which are black. Elytron brownish-black with a narrow yellow streak along folding of elytron. Hind wing slightly infumate. Abdomen brown, cerci and supra-anal plate darker brown.

Fore and middle legs olivaceous green. Hind femur in basal half olivaceous green, with fishbone pattern darker green, in distal half red with a yellow, narrow, antegenicular ring; lower inner marginal area completely red; inner medial area almost completely red. Hind knee, tibia and tarsus dark blue.

Measurements (length in mm): body, 19.0; pronotum, 3.8; elytron, 9.0; hind femur, 11.5.

Distribution: New Guinea (SW coast).

Discussion. Contrary to Ramme's (1941) statement, the holotype is in the collection of the Leiden Museum (C. Willemse, 1928, 1956). The agreement of the specimen with figure 7 in the original paper is conspicuous. The locality label reads "N. Guinea". In the original paper (p. 143) the locality is defined "Nieuw Guinea's zuid-westkust". The juvenile male of figure 8 in De Haan's paper could not be traced.

Comparison of the material at hand with the holotype of *unistrigata* reveals that a complex of closely related forms has been referred to that species previously. The differences in morphology and coloration are not conspicuous, but rather stable. It must be pointed out that when the material from different localities agrees in certain features, these localities always form a united section of the range of the whole complex. Due to the scanty morphological differences, especially in the shape of the apex of phallus, it is impossible to ascertain whether reproductive isolation has been achieved by the various populations. Only in one case, the quite distinct apex of phallus justifies the creation of a distinct taxon (*genjam*). The situation in the *unistrigata* complex can be compared with that in *Pseudocranae bimaculata* C. Willemse (F. Willemse, 1972: 53). I here arrange the material into six distinct Forms, of which Form 1 agrees with the holotype and Ramme's "*unistrigata* Färbungsrasse Mt. Arfak", Form 2 with Ramme's *caprai*, and Form 6 with Ramme's "*unistrigata* Färbungsrasse Sepik-Gebiet". The differences lie in the projecting ends of the apical penis valves and in the coloration. As to the latter, the yellow occipital spots, the width of the pronotal fasciae and the coloration of the legs, especially of the hind femur, appear to be of taxonomic value.

Form 1

Cranae unistrigata; Ramme, 1941: 90 (Färbungsrasse Mt. Arfak); C. Willemse, 1956: 107 (partim).

Material studied: Vogelkop, Fak Fak, S. Coast of Bomberai, 10—100 m, 12. vi. 1959, T. C. Maa (1 ♂) (MC); Fak Fak, C. J. L. Palmers (1 ♀, discoloured) (NMM); S. W. New Guinea, S. coast, Kambrau near Argoniibaai, 4. viii. 1941 (1 ♀) & near mouth of R. Aindoea, 12.viii. 1941 (1 ♀), E. Lundquist (NMM); Siwi (Forêt), 6.iii.1929, Prince Léopold (1 ♂) (NMM); Siwi, Arfak, 21.iv.—25.v.1928, Mayr (1 ♂, 1 ♀ ZMHU, 1 ♀ NMM).

The males of this material (all from Northwest New Guinea) agree fairly well with the holotype of *unistrigata,* especially in the apex of phallus.

The female, not yet described for *unistrigata* (s.l.), is larger than the male. Face, pl. 1 fig. 2. The tegmina are more separated dorsally and shorter than in the male. The elytron (pl. 3 fig. 18) is two-and-one-half times as long as wide, anterior margin moderately tapering apically. Abdominal terminalia as in the type-species. Dorsal aspect of subgenital plate and the spermatheca as in figs. 3—4. Coloration as in the male. Inner medial area of hind femur may be completely red, base of lower inner marginal area dark olivaceous. The measurements agree with those given by C. Willemse (1956). The Fak Fak material has not been recorded previously.

Form 2

Cranae unistrigata; I. Bolívar, 1898: 88 (only Sorong); C. Willemse, 1939: 75 (do); Kevan, 1966: 411 (do).
Cranae caprai Ramme, 1941: 91, fig. 38; C. Willemse, 1956: 99, 107.

Material studied: Sorong, T. Barbour (1 ♂, 2 ♀) (ANSP); Nieuw Guinea Expeditie 1903, Manikion, 14.—28.II (1 ♂) (NMM) (all discoloured).

Ramme described *caprai* after a single discoloured female from Sorong. The present material from Sorong agrees with Ramme's description. However, most, if not all, distinct characters just may be due to shrivelling. The apex of phallus of the Sorong male (figs. 26—27) differs from that of the holotype of *unistrigata,* in shorter and more tapering apical penis valves with tips less obtuse. Whether this distinction is reliable is difficult to evaluate as the specimen, like the female, is shrivelled by spirit.

The present Sorong material has been referred to *unistrigata* by Kevan (1966), the Manikion male to *caprai* by C. Willemse (1956). The locality of the latter could not be traced. The apex of phallus of this male agrees with that of *unistrigata's* holotype rather than with that of the Sorong male.

Form 3

Cranae unistrigata: I. Bolívar, 1898: 88 (only Waigiou); C. Willemse, 1939: 75 (do); 1956: 106 (do).

Material studied: Waigeou, Staudinger (1 ♀) (NMM).

Material from Waigou Island has been referred to *unistrigata* by I. Bolívar. A female of this material is at hand, bearing Bolívar's identification label. The

specimen differs from the female of Form 1 als follows: elytra shorter, reaching distal end of basal third of hind femur; subgenital plate flattened, not sulcate apically; occipital spots not ovoid, but elongate; fore and middle femora reddish; basal half of lower inner marginal area and fishbone pattern of outer medial area of hind femur black.

Form 4

Cranae unistrigata: Kevan, 1966: 411 (Jobi I. only).

Material studied: Jobi Isl., Poue, T. Barbour (2♂, discoloured) (ANSP, MC).

Different from the holotype of *unistrigata* in the apical penis valves (figs. 28—29) which are much shorter. Like in Form 2, the difference is difficult to evaluate.

Form 5

Material studied: Biak I., 5 m, 26.ix.1958, *Pandanus*, J. L. Gressitt (1 juv.♂, 1 ♀) (BPBM).

The phallic complex of the juvenile male is not yet sclerotized. The coloration of the specimen is similar to that of the adult female. The latter differs from the female of Form 1 in the coloration as follows: general colour of face and legs not olivaceous green but yellowish-green; black fasciae of head and pronotum narrower; distal part of hind femur not sanguineous red but suffused orange. This form comes near the following one.

Form 6

Cranae unistrigata: Ramme, 1941: 90 (Färbungsrasse Sepik-Gebiet); C. Willemse, 1956: 107 (partim).

Material studied: Neth. Ind.—Amer. New Guinea Exp. 1938—39, Hollandia, vii.1938, J. L. Toxopeus (2♀) & Bernhard Camp, 50 m, xii.1938, J. Olthof (1♀) (NMM); Neth. New Guinea, Waris, S. of Hollandia, 450—500m, 1—7.viii.1959, T. C. Maa (3♂) (BPBM); Kais. Wilhelmsland, Paup, 1910, Dr. Schlaginhaufen (1♀) (ZMHU); D.N. Guinea, Lager a. Töpferfluss, Kais. Augustafl. Exp., 29.iv.1912, Bürgers (1♀) & Standlager a. Aprilfl., 8—9.i.1912, Bürgers (1♂) (ZMHU); NE. New Guinea, Adelbert Mts., Wanuma, 800—1000 m, 27.x.1958, J. L. Gressitt (1♂, 1♀) (BPBM).

This group of specimens from several localities in the northern part of central New Guinea is uniform. It differs from Form 1 in the apex of phallus and in coloration. The apical penis valves are slightly shorter, wider basally and more tapering apically (figs. 30—31). The yellow occipital spots are conspicuously elongate, the black fasciae of head and pronotum narrower, fore and middle legs yellowish or olivaceous, hind femur yellowish or orange-yellowish and suffused with orange or orange-red distally; femur more marked in the male than in the female.

The material from Waris and Adelbert Mts. has not been recorded previously.

Cranae genjam sp.n.
(figs. 22—23, pl. 4 fig. 28)

Material studied: ♂ holotype, labelled: Neth., New Guinea, Genjam, 40 km W. of Hollandia, 100—200 m, 1—10.iii.1960, T. C. Maa (BPBM).

Description.

Male, pl. 4 fig. 28. Differs from *unistrigata* as follows: face less wrinkled, furculae larger, apical penis valves much shorter, wider basally and more strongly tapering apically (figs. 22—23). Coloration much as in the holotype of *unistrigata* except for the pronotum and hind femur. The black median fascia over pronotal dorsum narrower, as wide as each of the yellow lateral parts of the dorsum. The sanguineous distal part of hind femur much shorter, not extending over the inner lower marginal and inner medial areas and better defined.

Female. Unknown.

Measurements (length in mm): body, 20.5; pronotum, 4.3; elytron, 9.1; hind femur, 11.6.

Distribution: New Guinea (Genjam, near Hollandia).

Discussion. The species is well-defined by its resemblance to nominate *unistrigata* in combination with its different apical penis valves. As to this character, *genjam* is related with *tibialis* and *patagiata*.

Cranae trivittata C. Willemse, 1922
(pl. 2 fig. 12)

Cranae trivittata C. Willemse, 1922: 714, fig. 5; 1939: 75; F. Willemse, 1966a: 38; 1966b: 65 (Bivak Eiland only).
Cranae trivittata trivittata: Ramme, 1941: 92; C. Willemse, 1956: 99, 105 (partim).

Material studied: ♀ holotype, labelled: Z. Nieuw Guinea Lorentz 1909 - 10 Kloofbivak (ITZ).

Additional material: Z. Nieuw Guinea, Bivak Eiland, 1909—10, Lorentz (1♀) (NMM).

Redescription.

Male. Unknown.

Female. Differs from the type-species as follows. Head comparatively larger and rather more globose. Interocular distance wider. Fastigium verticis widely triangular, more declivous, apex wider. Pronotum (pl. 2 fig. 12) shorter, sulci weaker; dorsum more depressed, prozona, in profile, slightly upcurved; lateral lobe shorter than high, posterior margin slightly concave. Elytron slightly longer, reaching about middle of hind femur, apex narrower. Ovipositor valves more slender.

Coloration as described in the original paper. Marked characters are: head pale olivaceous green, with a black postocular fascia, yellow fascia along anterior margin of eye and lower margin of cheek and a pair of yellow, elongate-ovoid

spots from between the eyes, almost reaching pronotum; pronotum yellow with black fascia over upper part of lateral lobe and a median one over the dorsum, the width of the latter almost equal to the width of either yellow, lateral part; elytron black with yellow streak over the folding of elytron, at its base as wide as the yellow lateral part of pronotal dorsum; fore and middle legs and hind femur pale olivaceous green, the latter with fishbone pattern black, an ivory-white antegenicular ring, which is bordered by a narrow, complete, blackish ring proximally (see original paper, fig. 5).

Measurements (length in mm): body, 26.0—27.0; pronotum, 4.5—5.0; elytron, 8.8—9.0; hind femur 14.7—15.1.

Distribution: SW New Guinea (Kloofbivak and Bivakeiland).

Discussion. The large head, short pronotum and coloration are distinct characters. However, the male being unknown, the species cannot be properly defined. The external morphology is much as in the *unistrigata* group. The coloration resembles that of *rufipes* and *manokwari*.

Cranae rufipes Ramme, 1941
(figs. 32—33, pl. 2 fig. 13)

Cranae trivittata rufipes Ramme, 1941: 92; C. Willemse, 1956: 99, 106; 1962: 64.
Cranae trivittata trivittata: C. Willemse, 1956: 105 (partim) (?).

Material studied: ♀ holotype, labelled: Deutsch Neu Guinea (ZMHU).

Additional material: NE New Guinea, Huon Peninsula, Finschhafen, 10 m, 16.iv.1963, J. Sedlacek (1 ♀) (BPBM); Nouv. Guinée, Baie Triton, 1841, Jacquinot (1 ♀) (MNHN).

Redescription.

Male. Unknown (?), see below.

Female. Differs from the type-species in the slightly more globose head, wider interocular distance, more widely triangular fastigium verticis with wider apex and the slightly shorter elytra with narrower apex. Differs from *trivittata* in the less globose head and longer pronotum (pl. 2 fig. 13), with the dorsum less depressed and the prozona not upcurved.

Coloration differing from that in *trivittata* as follows: black median fascia over pronotal dorsum slightly wider, nearly one-and-a-half times as wide as width of either, yellow, lateral part of the dorsum; fore and middle femora reddish; hind femur with antegenicular ring slightly wider and olivaceous green, bordered proximally with a black ring, which is incomplete on the outer side.

Measurements (length in mm): body, 30.0-30.2; pronotum, 5.5—5.6; elytron, 7.5—7.9; hind femur, 14.0—14.9.

Distribution: NE New Guinea (Finschhafen and Triton Bay).

Discussion. Like *trivittata*, the taxon is not well-defined. The morphological distinction between *rufipes* and *trivittata* is clear enough to raise *rufipes* to specific rank. The Finschhafen female agrees completely with the holotype, while the female from Triton Bay differs slightly in general colour, which is more orange-

yellowish, and in the width of the antegenicular ring of hind femur, which is as narrow as in *trivittata*.

The following material is at hand: Kais. Wilhelmsland, Toricelli Gebirge, 1910, Dr. Schlaginhaufen (1 ♂, 1 ♀) (NMM); Neth. New Guinea, Waris, S. of Hollandia, 450—500 m, 16—23.viii. 1959, T. C. Maa (2 ♀) (BPBM). The morphology of this female material is very similar to that of the holotype of *rufipes*. However, the coloration is slightly different: fore and middle femora olivaceous yellow, black ring of hind femur complete, well-marked and as narrow as in *trivittata*, fishbone pattern of hind femur unicolorous with hind femur and yellow streak over elytron narrower.

By evidence of similarity, the pair from Toricelli Mts. is considered conspecific. The phallic complex of the male is much as in *unistrigata*, but the apical penis valves are much wider (figs. 32—33). The two specimens were referred to nominate *trivittata* by C. Willemse (1956). However, I am not certain whether this material represents *rufipes* or a distinct taxon.

Cranae manokwari sp.n.
(figs. 34—35, pl. 3 fig. 19, pl. 4 fig. 29)

Material studied: ♂ holo-, ♀ allotype, labelled: New Guinea, Manokwari, Tafelberg 150 m 22.11.63 R. Straatman (BPBM).

Description.

Male, pl. 4 fig. 29. Differs from the type-species as follows: head more globose, interocular distance and fastigum verticis wider, elytron narrower with anterior margin more evenly rounded; apical penis valves (figs. 34—35) rather tapering apically, tips tooth-shaped and slightly outcurved.

Coloration as in *rufipes,* but vertex between the eyes and occiput completely black with two small, ovoid, yellow spots as in nominate *unistrigata*; median black fascia of pronotal dorsum slightly wider and fore and middle femora olivaceous yellow.

Female. Elytron, pl. 3 fig. 19. Abdominal terminalia as in type-species. Coloration as in male, except upper side of head which is more yellowish-brown with occipital spots faintly indicated.

Measurements (length in mm): body, ♂ 22.4, ♀ 30.3; pronotum, ♂ 4.4, ♀ 5.1; elytron, ♂ 7.8, ♀ 8.2; hind femur, ♂ 11.9, ♀ 14.0.

Distribution: NW New Guinea (Tafelberg near Manokwari).

Discussion. The species is well-defined by the apex of phallus and the coloration. It appears to be closely related to *rufipes*.

Cranae longipennis sp.n.
(figs. 14—15, 36—37, pl. 1 fig. 4, pl. 3 fig. 20, pl. 5 fig. 31)

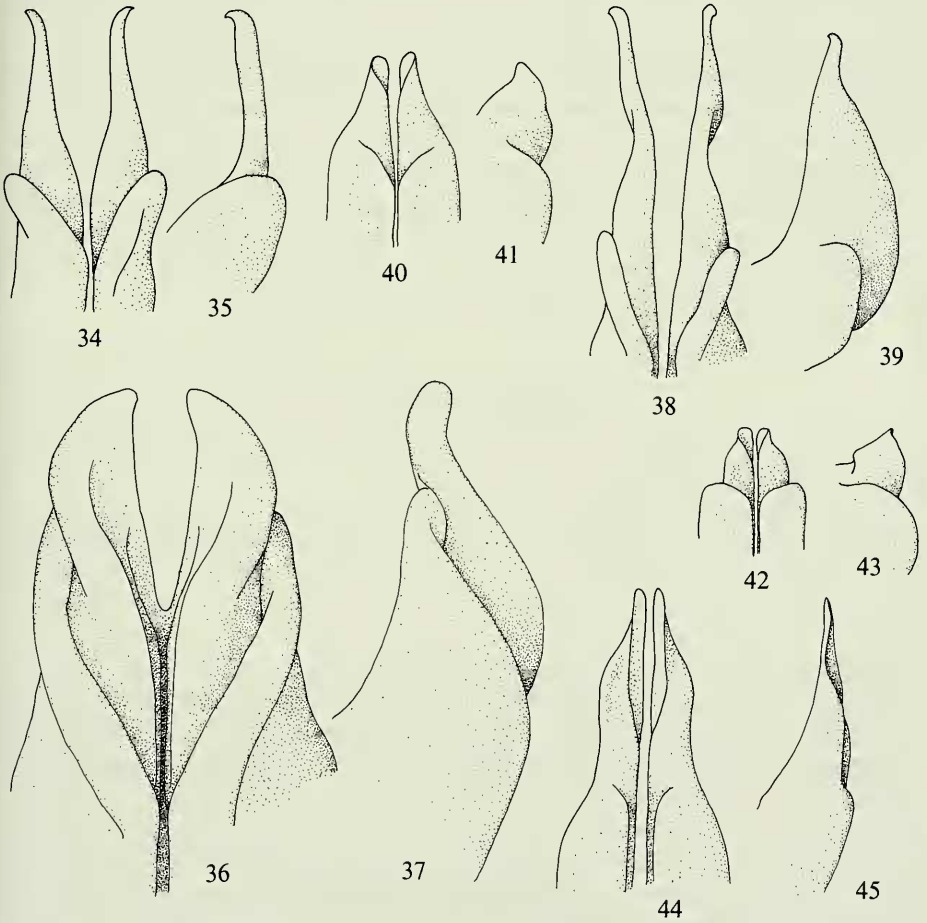
Material studied: ♂ holotype, ♀ allotype, labelled: Papua, Fly R. Olsabip 400—800 m, viii. 69, J. & M. Sedlacek (BPBM); paratypes: Neth. New Guinea Exp. Star Range, Katem 200 m, 15.vi.1959 (2♂) (RNH).

Description.

Male, pl. 5 fig. 31. Differs from the type-species in body, head, tegmina, abdominal terminalia and coloration. Body of larger size and more robust. Face wider and more wrinkled. Fastigium verticis and interocular distance wider. Tegmina longer, reaching end of middle third of hind femur. Elytron about three times as long as wide and less tapering. Cerci more pointed and robust.

Phallic complex very large. Ancorae of epiphallus (figs. 14—15) partly joined with the lateral plates. Apex of phallus (figs. 36—37) very robust, sheath of penis conspicuously developed, tips of apical penis valves shell-shaped.

Coloration black, bluish-green, blue and yellow. Antennae blackish. Head greenish-black with following parts cadmium-yellow: sulcus of fastigium verticis



Figs. 34—45. *Cranae* species, ♂, tips of apical penis valves and sheath of penis, ventro-posterior (even numbers) and left lateral (odd numbers) view, similar scales; 34—35, *manokwari* sp.n. (holotype); 36—37, *longipennis* sp.n. (holotype); 38—39, *rubra* sp.n. (holotype); 40—41, *kuekenthali* Brunner (paratype); 42—43, *luctuosa* C. Bolívar (Telaga, Obi I.); 44—45, *pictipennis* C. Willemse (allotype).

and frontal ridge, scape, deep and symmetrical impressions of face, face along lateral keels and cheek along lower margin, the mouthparts partly, and a narrow stripe along dorso-posterior margin of eye. Pronotum yellow with three, longitudinal, wide, black fasciae: on each side, over the upper two-thirds of lateral lobe and a median one over the dorsum, being about twice as wide as the yellow lateral parts of the dorsum. Rest of thorax yellowish with episternum, upper part of pleurae and margins and sutures of meso- and metasterna black. Elytron black with wide, median, cadmium-yellow streak. Hind wing infumate. Abdomen yellowish-brown, tergites laterally suffused green. Cerci and a median stripe on supra-anal plate yellow. Fore and middle legs dark green with yellow streaks. Hind femur yellowish or olivaceous green, carinae and fishbone pattern dark olivaceous or bluish-green, inner lower marginal area completely dark blue. Hind knee dark blue with yellowish-white antegenicular ring, which is shorter than length of hind knee and incomplete ventrally. Hind tibia and tarsus bluish-black, tibia with a narrow, yellowish-white, postgenicular ring, hind tarsus yellowish laterally.

Female. Larger than the male. Face, pl. 1 fig. 4. Elytron, pl. 3 fig. 20. Abdominal terminalia as in the type-species, but more robust. Coloration as in the male.

Measurements (lenght in mm): body, ♂ 24.0—26.0, ♀ 33.2; pronotum, ♂ 4.6—5.0, ♀ 6.3; elytron, ♂ 11.3—11.6, ♀ 12.3; hind femur, ♂ 12.5—12.7, ♀ 16.0.

Distribution: S. New Guinea (Katem, Star Range and Olsabip, Fly River).

Discussion. The species is very distinct. Shape and measurements of tegmina and phallic complex are conspicuous. The species seems related to the *unistrigata* complex rather than to other species.

Cranae rubra sp.n.
(figs. 38—39, pl. 5 fig. 32)

Cranae patagiata; Krauss, 1903: 747, 759 (British New Guinea) (?)
Cranae sp. aff.*patagiata;* Kevan, 1966: 410 (not Normanby I.).

Material studied: ♂ holotype, ♀ allotype, ♀ paratype, labelled: New Guinea: Papua Woodlark I (Murua) Kulumadau Hill, Mar. 19—22. 1957, W. W. Brandt, *Cranae patagiata* St.? det. D. K. mcE. Kevan, 1965 (BPBM).

Description.

Male. (pl. 5 fig. 32). Differs from the type-species as follows: pronotum narrower and shorter with dorsum more depressed and sulci slightly stronger; legs slightly more slender; apical penis valves (figs. 38—39) long, flattened laterally, tips slightly pointed and recurved.

Coloration black, carmine and yellow. Head and thorax as in *unistrigata*, but occipital spots smaller. Elytron carmine, anterior margin widely, posterior margin narrowly bordered with black. Abdomen and legs as in type-species, except for the hind femur. Hind femur in basal half carmine, in distal half blackish-red with a yellow antegenicular ring, which is almost twice as long as the length of hind knee.

Female. Larger than the male. Abdominal terminalia as in the type-species. Coloration as in the male, but face more unicolorous yellow.

Measurements (length in mm): body, ♂ 18.9, ♀ 23.6—24.5; pronotum, ♂ 3.6, ♀ 4.5—4.8; elytron, ♂ 8.2, ♀ 8.2—8.4; hind femur, ♂ 11.7, ♀ 13.0—13.5.

Distribution: New Guinea (Papua: Woodlark I.).

Discussion. The species is well-defined by the apex of phallus and the coloration. Although the coloration is much as in *patagiata*, the species agrees more closely with the *unistrigata* complex. The material studied by Krauss was not at hand.

Cranae kuekenthali Brunner, 1898
(figs. 11—13, 40—41, pl. 3 fig. 21)

Ramme (1941) distinguished two subspecies, viz., *kuekenthali* and *annulata*. The nominate form occurs in the northeastern part of Halmahera, *annulata* in the western part of that island. Distinction was based on different coloration of the hind femur. Ramme, in the same paper, synonymized the male of *Cranae marginata* Brunner with nominate *kuekenthali*. Neither the type of *marginata*, nor that of *annulata* or nominate *kuekenthali* could be studied (deposited in the Senckenberg Museum Frankfurt). The only material available for the present study are a paratypic male of nominate *kuekenthali* and some discoloured material, labelled: Halmahera, T. Barbour (1♂, 2 ♀ ANSP, 1♂ MC). As to the discoloured material, agreement with *kuekenthali* is apparent, but subspecific distinction is impossible. For the time being, no comments are given on Ramme's opinion.

Cranae kuekenthali kuekenthali Brunner, 1898

Cranae kuekenthali Brunner, 1898: 198, 238, pl. 18 fig. 136 (partim); Kirby, 1910: 387; C. Bolívar, 1923: 146; C. Willemse, 1939: 74; Ramme, 1941: 88, 89; Kevan, 1966: 411.
Cranae kuekenthali kuekenthali; Ramme, 1941: 89; C. Willemse, 1956: 98, 102.
Cranae marginata Brunner, 1898: 198, 236, 237 (partim); Kirby, 1910: 387; C. Willemse, 1939: 74; Ramme, 1941: 87, 89 (♂ synonymy established); C. Willemse, 1956: 102 (in synonymy only).

Material studied: 1♂ paratype, labelled: Halmaheira 1894 W. Kükenthal leg., Paratypus (ZMHU).

Redescription.

Male. Differs from the type-species as follows. Integument of face and pronotum smoother, scarcely pitted. Head larger; face less wrinkled, wider and slightly depressed along lateral keels. Pronotum shorter, more cylindrical (dorsum less depressed), in the middle slightly compressed laterally; sulci stronger; lateral lobe not as long as high, posterior angle slightly pointed. Elytron shorter, reaching about end of basal fourth of hind femur, about twice as long as wide, anterior margin evenly and widely rounded, archedyction conspicuous. Furculae slightly larger and closer together. Cercus more slender and extending slightly beyond tip of subgenital plate. Ancorae of epiphallus not joined with lateral plates (fig. 11). Cingular rami much wider (figs. 12—13). Apex of phallus shorter, roughly conical, tip of penis valves excavated medially (figs. 40—41).

Coloration as given in the original paper. Marked characters are summarized as follows: head yellow with wide, black, postocular fascia and narrower, black stripe

from between eyes over occiput, widening posteriorly; pronotum black, margins bordered with yellow, along anterior margin of dorsum widened into a pair of yellow spots; elytron yellowish, apex and apical part of anterior margin bordered with black; femora orange-red, the hind one apically more yellowish and with a narrow, black ring placed just distally of middle of hind femur; hind knee blackish; hind tibia bluish suffused with yellowish.

Female. Larger than male. Subgenital plate flattened, between the keels not sulcate. Elytron as in pl. 3 fig. 21, in other specimens the black pigmentation may extend more anteriorly. Coloration as in the male.

Measurements (length in mm): body, ♂ 21.0—22.0, ♀ 29.0—29.5; pronotum, ♂ 4.1—4.4, ♀ 5.5—5.7; elytron, ♂ 5.6—5.8, ♀ 5.2—5.3; hind femur, ♂ 12.4—12.6, ♀ 15.2—15.6.

Distribution: Moluccas (Halmahera).

Discussion. The species is well-defined by the external morphology, the phallic complex and the coloration. The description of the female has been made after the discoloured material recorded above (ANSP, MC). Whether the not sulcate female subgenital plate is a reliable character is not certain, as the material is shrivelled. A figure of the phallic complex is also given by Kevan (1966, Pacific Insects 8: 697, fig. 2) under the name *Cranae kuekenthali* (nec I. Bolívar). The species, together with *luctuosa*, forms a group (see below under *luctuosa*).

Cranae kuekenthali annulata Ramme, 1941

Cranae kuekenthali Brunner, 1898: 198, 236, 238, pl. 18 fig. 36 (partim).
Cranae kuekenthali annulata Ramme, 1941: 89; C. Willemse, 1956: 99, 102; Kevan, 1966: 411.

No comments are given because of lack of material.

Cranae luctuosa C. Bolívar, 1923
(figs. 42—43, pl. 1 fig. 5, pl. 2 fig. 14, pl. 3 fig. 22, pl. 4 fig. 30)

Cranae luctuosa C. Bolívar, 1923: 145; C. Willemse, 1939: 74; 1956: 99, 103; F. Willemse, 1966b: 64.

Material studied: 1 ♂ paratype, labelled: Moluques Obi Major J. Waterstradt 1902 (NMM).

Additional material: Obi I., Telaga, 3 & 4 & 25 & 26.viii. 1953 (4 ♂, 1 ♀ NMM; 1 ♂, 1 ♀ RNH); Obi I., Laiwui, 27.ix.1953 (1 ♀) (NMM).

Redescription.

Male, pl. 4 fig. 30. Differs from *kuekenthali* as follows. Head larger, more globose. Pronotum, pl. 2 fig. 14; posterior margin of lateral lobe slightly concave. Elytron longer, about three times as long as wide, anterior margin less widely rounded. Supra-anal plate slightly wider and shorter, transverse ridges more distinct. Cerci longer, extending well beyond tip of subgenital plate. Apex of phallus slightly smaller and less conical (figs. 42—43).

Coloration as described by C. Willemse (1956). Marked characters are as

follows. Head from pale yellow to olivaceous yellow, with the following parts bluish-black: a transverse stripe over the face below the antennae, a wider one along clypeal margin and lower margin of cheek, more or less the whole cheek, the area behind the eye, a median stripe over the occiput and the posterior part of the latter. Thorax bluish-black, margins of pronotum yellow or, usually, as spotted yellow: a median one on the anterior margin of the dorsum and the others on the anterior and posterior angles of the lateral lobe. Elytron yellowish-white, apex and apical part of anterior margin bordered with black. Fore and middle legs olivaceous green, more or less suffused with bluish. Hind femur in proximal two-thirds bluish-black, in distal third yellow. Hind knee and tibia bluish-black.

Female. Larger than the male. Face, pl. 1 fig. 5. Elytron, pl. 3 fig. 22. Abdominal terminalia as in *kuekenthali*. Coloration as in the male, but head, pronotum and hind femur less black and occasionally almost completely yellowish.

Measurements as given by C. Willemse (1956).

Distribution: Moluccas (Obi I.).

Discussion. The species is well-defined by morphology and coloration. Its resemblance to *kuekenthali* is striking. Both species are characterized, among *Cranae*, by smoother integument, shorter and more cylindrical pronotum with deeper sulci and another type of phallic complex. In these characters, the two agree with *Opiptacris* Walker rather than with *Cranae*. However, the developed tegmina and the open tympanum do not agree with *Opiptacris*.

Cranae glabra sp.n.
(pl. 1 fig. 6, pl. 2 fig. 15, pl. 3 fig. 23, pl. 5 fig. 33)

Material studied: ♀ holotype, 1 ♀ paratype, labelled: Neth. New Guinea: Biak I.: Kampong Landbouw, 50—100 m, May 27, 1959, J. L. Gressitt; 1 ♀ paratype: Biak I. (Neth. N. Guinea) SE coast 5 m, xi—26—1958, *Freycinetia*, J. L. Gressitt; 1 juvenile ♂ Neth. New Guinea; Biak I., Mokmer 5—10 m, v—26—1959, J. L. Gressit (all BPBM).

Description.

Male. Cerci of the juvenile male long, extending well beyond tip of subgenital plate. Phallic complex not sclerotized. Coloration pale yellowish.

Female, pl. 5 fig. 33. Differs from the type-species as follows. Body more slender, integument much smoother. Face (pl. 1 fig. 6) not wrinkled and comparatively narrow. Pronotum (pl. 2 fig. 15) shorter, more cylindrical, in the middle slightly laterally compressed, sulci stronger, posterior angle of lateral lobe slightly pointed and posterior margin slightly concave.

Elytron (pl. 3 fig. 23) smaller, much narrower, three times as long as wide, reaching middle of second abdominal tergite, both elytra widely separated dorsally; anterior margin slightly rounded, posterior margin straight, distally tapering towards narrow, undivided, parabolic apex; veins rather reduced, not by far reaching anterior margin. Hind wing almost as long as elytron. Tympanum as usual. Legs slender, hind femur attenuate, fishbone pattern and keels moderately developed. Subgenital plate flattened, not sulcated between low keels.

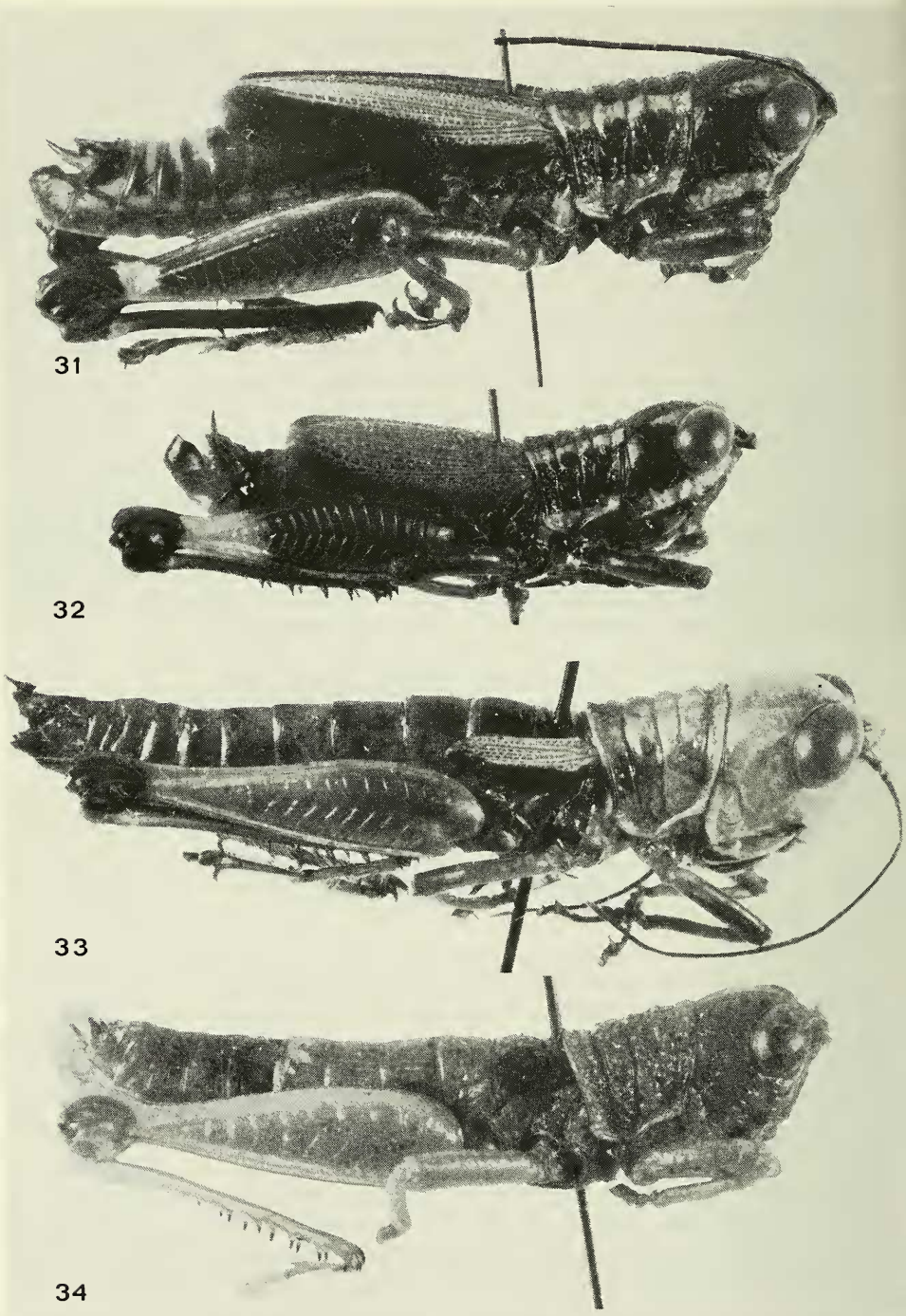


Plate 5. Figs. 31—34. *Cranae* species, lateral view: 31, *longipennis* sp.n., ♂ (holotype); 32, *rubra* sp.n., ♂ (holotype); 33, *glabra* sp.n., ♀ (holotype); 34, *pictipennis* C. Willemse, ♂ (allotype).

Coloration yellowish and orange-brown. Antennae dark brown, apically paler. Head yellowish, mouthparts mottled with bluish-green. Pronotum orange-brown with three narrow, bluish-green fasciae: on each side over upper part of lateral lobe and a median one over dorsum; these fasciae are widest along anterior and posterior margins of pronotum, and almost obsolete near the middle of pronotum. Pleurae with lower part orange-brown, upper part bluish-black. Pro-, meso- and metasterna brownish. Elytron yellow, anterior margin broadly bordered with black. Abdomen brown, proximal tergites blackish brown. Coxae orange-brown. Fore and middle legs orange-brown, tibiae suffused with bluish-green. Hind femur orange-brown, lower inner marginal area bluish, outer side basally slightly suffused with dark brown. Hind knee, tibia and tarsus dark blue or bluish-green.

Measurements (♀ length in mm): body, ♂ 27.8—28.3; pronotum, 4.7—4.8; elytron, 5.1—5.8; hind femur, 13.8—14.6.

Distribution: New Guinea (Biak I.).

Discussion. Although the adult male is not known, the species is well-defined. Both morphology and coloration are quite distinct. Integument, head, pronotum and female abdominal terminalia agree with *kuekenthali* and *luctuosa*. These features agree with *Opiptacris* Walker rather than with *Cranae*. Besides, the tegmina in *glabra* are much as in some species of *Cranaella* Ramme (compare F. Willemse, 1977: 110). Apparently, *Cranae glabra* is more or less intermediate between *Cranae, Cranaella* and *Opiptacris*.

Cranae pictipennis C. Willemse, 1932
(figs. 44—45, pl. 1 fig. 7, pl. 2 fig. 16, pl. 3 fig. 24, pl. 5 fig. 34)

Cranae pictipennis C. Willemse, 1932: 279; 1939: 74; F. Willemse, 1966a: 38; 1966b: 64; 1976: 121 (original combination re-established).
Opiptacris pictipennis; Uvarov, 1937: 17, 18; C. Willemse, 1956: 95.

Material studied: type-series, labelled: Buru, Station Nal Besi (♀ paratype, RNH) & Station 16 (♀ holotype, RNH) & Station 7 (♂ allotype, NMM), 1921, leg. L. J. Toxopeus, *Cranae pictipennis* nov. sp. det. C. Willemse, *Opiptacris pictipennis* Will. det. C. Willemse, type-labels. The specimens are discoloured.

Redescription.

Male, pl. 5 fig. 34. Differs from the type-species as follows. Body more robust. Integument of face and pronotum (pl. 2 fig. 16) strongly pitted. Pronotum with sulci less deep, posterior angle of lateral lobe obtusely pointed, posterior margin slightly concave laterally, slightly emarginate dorsally. Tympanum closed, as a narrow, hour-glass-shaped furrow. Elytron very short, reaching first abdominal tergite, roughly circular with apex broadly rounded to almost truncated, venation obsolete. Hind wing represented by a small membrane. Phallic complex as in type-species, except for its apex. Sheath of penis not strongly folded apically but more gradually merging into apical penis valves (figs. 44—45); the latter tapering apically and excavated medially.

Coloration. The material is strongly discoloured. Elytra, apex of mandible,

crescents of hind knee and furculae of the male, all black. A faintly retained pattern on the head and pronotum is much as in *kuekenthali.*

Female. Larger than the male. Face, pl. 1 fig. 7. Elytron, pl. 3 fig. 24. Abdominal terminalia about as in the type-species. Coloration as in the male.

Measurements (length in mm): body, ♂ 25.1, ♀ 28.1—32.0; pronotum, ♂ 4.7, ♀ 5.3—5.3; elytron, ♂ 2.6, ♀ 2.8—3.0; hind femur, ♂ 13.4, ♀ 14.8—15.1.

Distribution: Moluccas (Buru).

Discussion. The species is well-defined morphologically. In the tegmina and tympanum it agrees with *Opiptacris* Walker. However, the integument and especially the phallic complex disagree strongly with that genus. The integument is much as in *Cranaella* Ramme. As in the case of *glabra* and the *kuekenthali-luctuosa* group, *pictipennis* forms a link between *Cranae, Cranaella,* and *Opiptacris.*

Cranae emendata Brunner, 1898

Cranae emendata Brunner, 1898: 196, 236, 237; Kirby, 1910: 387; C. Willemse, 1939: 74; Ramme, 1941: 92; C. Willemse 1956: 98, 99

The species is known after a single, discoloured female from Borneo. The type is in the Senckenberg Museum, Frankfurt, and not at hand. As no further material of the genus is known from Borneo, the record certainly needs confirmation.

The following five species are briefly described but pending the discovery of the male, no species name is proposed.

Cranae sp.

Material studied: NE. New Guinea, Aseki, 19.xii.1965, H. Pyka (1 ♀) (author's collection).

Near *longipennis.* Body robust, face wide and strongly wrinkled. Pronotum rather depressed from above, tegmina wide and long, reaching beyond the middle of hind femur. General colour black; yellow stripes over head and pronotum as in *unistrigata*, but wider; elytron with a broad yellow streak; all femora red, the hind one with a yellow antegenicular ring and yellow streaks, one over the upper marginal areas and another along the lower outer carinula; hind knee black; all tibiae blackish, suffused with red.

Cranae sp.

Cranae sp. aff. *patagiata*; Kevan, 1966: 410 (Normanby I. only).

Material studied: Papua, Normanby I., Wakaiuna, Sewa Bay 1—10.xi.1956, M. W. Brandt (2 juv. ♂, 1 ♀) (BPBM).

Near *trivittata, rufipes* and *manokwari.* Head about as large as in *trivittata*, pronotum about as in *rufipes.* Phallic complex of juvenile males not yet sclerotized.

Coloration as in *rufipes*, except for the legs. Fore and middle legs olivaceous. Hind femur scarlet red with a broad, yellow antegenicular ring, bordered proximally by a narrow black incomplete ring. Hind femur much as in *rubra*.

Cranae sp.

Material studied: NE New Guinea, Bubia, Markham R., 50 m, 20.ix.1955, J. L. Gressitt (1 ♀) (BPBM).

Near *manokwari* but differing by more globose head and coloration of hind leg. Hind femur olivaceous green, fishbone pattern bluish-black, antegenicular ring orange-red, bordered proximally by a black dorsal spot. Hind knee and tibia dark blue.

Cranae sp.

Cranae unistrigata; C. Willemse, 1956: 106 (Sabang only).

Material studied: Nieuw Guinea, Sabang vii.1907, Lorentz (1 ♀) (NMM).

Near *unistrigata*, but differing by more robust body, shorter pronotum and coloration. Black fasciae of head and pronotum conspicuously narrower, median one as wide as each of the yellow lateral parts of dorsum. Yellow streak over elytron much wider. Hind femur yellow, fishbone pattern dark olivaceous, yellow antegenicular ring narrower and bordered proximally by a narrower, well-marked red ring.

Cranae sp.

Cranae unistrigata; Kevan, 1966: 411 (Roon I. only).

Material studied: D. N. Guinea, Roon Isl., Thomas Barbour (1 ♀) (ANSP). The specimen is discoloured.

Near *unistrigata*, but rather more robust and head remarkably large and globose. The discoloration being incomplete, the following pattern is still recognizable: between the eyes a pair of black spots, behind the eye a wide black fascia, pronotum unicolorous except for the central area of lateral lobe, which is darker. Elytron as in *unistrigata*.

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